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## Abbas Askar

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## Professional Appointments/Positions

- Lund Observatory, Department of Astronomy and Theoretical Physics, Lund University, Lund, Sweden **12/06/2018 to present**

**Postdoctoral Researcher (Carl Tryggers Fellow – 06/2018 to 05/2020)**

- Nicolaus Copernicus Astronomical Center, Warsaw, Poland **04/11/2013 to 25/05/2018**

**Graduate Student/Research Assistant**

## Education

- **PhD in Astronomy (with distinction)** **04/11/2013 to 25/05/2018**

Nicolaus Copernicus Astronomical Center (CAMK)

Polish Academy of Sciences, Warsaw, Poland

Supervisor: Dr. Mirek Giersz

Thesis: *“Investigation of Black Hole Populations in Dense Stellar Systems using MOCCA code for Star Cluster Simulations”*

- **Master of Science in Astronomy & Astrophysics** **04/10/2010 to 27/09/2012**

AstroMundus-Erasmus Mundus Joint Masters Program in Astrophysics

University of Innsbruck, Austria (1<sup>st</sup> semester)

University of Padova, Italy (2<sup>nd</sup> & 4<sup>th</sup> semesters)

University of Belgrade, Serbia (3<sup>rd</sup> semester)

Master Thesis: *“Optical Counterparts of Ultraluminous X-ray Sources”*

Supervisor: Dr Luca Zampieri (INAF - Padova)

- **Bachelor of Science (Honors) & Bachelor of Arts (Honors) in Liberal Arts & Sciences** **21/08/2006 to 10/07/2009**

University College Utrecht, Utrecht University, The Netherlands

Double Major in Physical Sciences (Physics & Mathematics)

& Humanities (Philosophy & Religious Studies)

Bachelor Thesis (Science) : *“Peculiar Features in the Onsets of Thermonuclear Flashes on Neutron Stars”*

Supervisor: Dr. Jean in’t Zand (HEA, SRON Netherlands Institute for Space Research)

Bachelor Thesis (Humanities): *“The Problem of Redemptive Truth: From Nietzsche to a Post-Metaphysical Culture”*

Supervisor: Dr. Floris van der Burg (University College Utrecht)

- **GCE Advanced & Ordinary Level** **03/09/2001 to 30/06/2006**

University College Lahore, Lahore, Pakistan

5 years of the British high school curriculum

## Refereed Publications in Peer-Reviewed Journals

1. **A. Askar**, M. B. Davies and R. P. Church: *Formation of super-massive black holes in galactic nuclei I: delivering seed intermediate-mass black holes in massive stellar clusters*. *MNRAS*, Vol. 502, Issue 2, pp.2682-2700 (2021).  
Link: <https://ui.adsabs.harvard.edu/abs/2021MNRAS.502.2682A/abstract>
2. F. Aros, A. C. Sippel, A. Mastrobuono-Battisti, **A. Askar**, P. Bianchini and G. van de Ven: *Dynamical modelling of globular clusters: challenges for the robust determination of IMBH candidates*. *MNRAS*, Vol. 499, Issue 4, pp.4646-4665 (2020).  
Link: <https://ui.adsabs.harvard.edu/abs/2020MNRAS.499.4646A/abstract>
3. J. Hong, **A. Askar**, M. Giersz, A. Hypki and S. Yoon: *MOCCA-SURVEY Database I: Binary black hole mergers from globular clusters with intermediate mass black holes*. *MNRAS*, Vol. 498, Issue 3, pp.4287-4294 (2020).  
Link: <https://ui.adsabs.harvard.edu/abs/2020MNRAS.498.4287H/abstract>
4. J. Samsing, D. J D'Orazio, K. Kremer, C. L. Rodriguez and **A. Askar**: *Single-single gravitational-wave captures in globular clusters: Eccentric deci-Hertz sources observable by DECIGO and Tian-Qin*. *Physical Review D*, Vol. 101, Issue 12, article id.123010 (2020)  
Link: <https://ui.adsabs.harvard.edu/abs/2020PhRvD.101l3010S/abstract>.
5. K. Belczynski, J. Klencki, C. E. Fields, A. Olejak, E. Berti, G. Meynet, C. L Fryer, D. Holz, R. O'Shaughnessy, D. A. Brown, T. Bulik, S. Leung, K. Nomoto, P. Madau, R. Hirschi, S. Jones, S. Mondal, M. Chruslinska, P. Drozda, D. Gerosa, Z. Doctor, M. Giersz, S. Ekstrom, C. Georgy, **A. Askar**, V. Baibhav, D. Wysocki, T. Natan, W. M. Farr, G. Wiktorowicz, Miller, M. Coleman, B. Farr and J.P Lasota: *The evolutionary roads leading to low effective spins, high black hole masses, and O1/O2 rates of LIGO/Virgo binary black holes*. *A&A*, Vol. 636, id.A104, 40 pp. (2020).  
Link: <https://ui.adsabs.harvard.edu/abs/2020A%26A...636A.104B/abstract>.
6. B. Giesers, S. Kamann, S. Dreizler, T. Husser, **A. Askar**, F. Göttgens, J. Brinchmann, M. Latour, P. M. Weilbacher, M. Wendt and M. M. Roth: *A stellar census in globular clusters with MUSE: Binaries in NGC 3201*. *A&A*, Vol. 632, id.A3, 20 pp. (2019).  
Link: <https://ui.adsabs.harvard.edu/abs/2019A%26A...632A...3G/abstract>
7. M. Giersz, **A. Askar**, L. Wang, A. Hypki, A. Leveque and R. Spurzem: *MOCCA-SURVEY database I. Dissolution of tidally filling star – clusters harbouring black hole subsystems*. *MNRAS*, Vol. 487, Issue 2, p.2412-2423 (2019).  
Link: <http://adsabs.harvard.edu/abs/2019MNRAS.487.2412G/abstract>
8. **A. Askar**, **A. Askar**, M. Pasquato and M. Giersz,: *Finding Black Holes with Black Boxes Using Machine Learning to Identify Globular Clusters with Black Hole Subsystems*. *MNRAS*, Vol. 485, Issue 4, p.5345-5362 (2019). Link: <http://adsabs.harvard.edu/abs/2019MNRAS.485.5345A>
9. D. Belloni, M. Giersz, L.E. Rivera Sandoval, **A. Askar** and P. Cieciela: *MOCCA-SURVEY database I. Accreting white dwarf binary systems in globular clusters – IV. cataclysmic variables – properties of bright and faint populations*. *MNRAS*, Vol. 483, Issue 1, p.315-331 (2019).  
Link: <http://adsabs.harvard.edu/abs/2019MNRAS.483..315B>
10. J. Morawski, M. Giersz, **A. Askar**, and K. Belczynski: *MOCCA-SURVEY Database I: Assessing GW kick retention fractions for BH-BH mergers in globular clusters*. *MNRAS*, Vol. 481, Issue 2, p.2168-2179 (2018).  
Link: <http://adsabs.harvard.edu/abs/2018MNRAS.481.2168M>
11. J. Hong, E. Vesperini, **A. Askar**, M. Giersz, and M. Szkudlarek: *Binary Black Hole Mergers from Globular Clusters: the Impact of Globular Cluster Properties*. *MNRAS* Vol. 480, Issue 4, p.5645-5656 (2018).  
Link: <http://adsabs.harvard.edu/abs/2018MNRAS.480.5645H>

12. M. Arca-Sedda, **A. Askar**, and M. Giersz: *MOCCA-SURVEY Database I. Unravelling black hole sub-systems in globular clusters*. *MNRAS* Vol. 479, Issue 4, p.4652-4664 (2018).  
Link: <http://adsabs.harvard.edu/abs/2018MNRAS.479.4652A>
13. **A. Askar**, M. Arca-Sedda, and M. Giersz: *MOCCA-SURVEY Database I: Galactic Globular Clusters Harboursing a Black Hole Subsystem*. *MNRAS* Vol. 478, Issue 2, p.1844-1854 (2018).  
Link: <http://adsabs.harvard.edu/abs/2018MNRAS.478.1844A>
14. K. Belczynski, **A. Askar**, M. Arca-Sedda, M. Chruslinska, M. Donnari, M. Giersz, M. Benacquista, R. Spurzem, D. Jin, G. Wiktorowicz and D. Belloni: *The The origin of the first neutron star – neutron star merger*. *A&A*, Vol. 615, id.A91, 13 pp (2018).  
Link: <http://adsabs.harvard.edu/abs/2018A%26A...615A...91>
15. **A. Askar**, M. Giersz, W. Pych and E. Dalessandro: *COCOA code for creating mock observations of star cluster models*. *MNRAS* Vol 475, Issue 3, p.4170-4185 (2017).  
Link: <http://adsabs.harvard.edu/abs/2018MNRAS.475.4170A>
16. J. Samsing, **A. Askar** and M. Giersz: *MOCCA-SURVEY Database I: Eccentric Black Hole Mergers During Binary-Single Interactions In Globular Clusters*. *ApJ* Vol. 855, 2, article id. 124, 5 pp.(2018).  
Link: <http://adsabs.harvard.edu/abs/2018ApJ...855..124S>.
17. J. Hong, R. de Grijs , **A. Askar**, P. Berczik, C. Li, L. Wang, L. Deng, M. B. N. Kouwenhoven, M. Giersz and M., R. Spurzem: *The dynamical origin of multiple populations in intermediate-age clusters in the Magellanic clouds*. *MNRAS* Vol 472, 1, p.67-77(2017).  
Link: <http://adsabs.harvard.edu/abs/2017MNRAS.472...67H>
18. D.Belloni, **A. Askar**, M. Giersz, P. Kroupa & H.J, Rocha-Pinto: *On the initial binary population for star cluster simulations*. *MNRAS* Vol 471, 3, p.2812-2828 (2017).  
Link: <http://adsabs.harvard.edu/abs/2017MNRAS.471.2812B>
19. D.Belloni, M. Zorotvic, M. Schreiber, N.W.C Leigh, M. Giersz and **A. Askar**: *MOCCA-SURVEY database I. Accreting white dwarf binary systems in globular clusters – III. Cataclysmic variables – Implications of model assumptions*. *MNRAS* 2017 Vol. 468, 2, p.2429-2446 (2017).  
Link: <http://adsabs.harvard.edu/abs/2017MNRAS.468.2429B>
20. R.d. Vita, M. Trenti, P. Bianchini, **A. Askar**, M. Giersz and G. van de Ven: *Prospects for detection of intermediate-mass black holes in globular clusters using integrated-light spectroscopy*. *MNRAS* Vol. 467, 4, p.4057-4066 (2017).  
Link: <http://adsabs.harvard.edu/abs/2017MNRAS.467.4057D>
21. D. Belloni, M. Giersz, H.J, Rocha-Pinto, N.W.C Leigh, **A. Askar**: *MOCCA-SURVEY database I. Accreting white dwarf binary systems in globular clusters - II. Cataclysmic variables - progenitors and population at birth*. *MNRAS* Vol 464, 4, p.4077-4095 (2017).  
Link: <http://adsabs.harvard.edu/abs/2017MNRAS.464.4077B>
22. **A. Askar**, M. Szkudlarek, D.Gondek-Rosińska, M. Giersz and T. Bulik: *MOCCA-SURVEY Database - I. Coalescing binary black holes originating from globular clusters*. *MNRAS Letters* Vol. 464, p.L36-L40 (2017).  
Link: <http://adsabs.harvard.edu/abs/2017MNRAS.464L..36A>
23. **A. Askar**, P. Bianchini, R.d. Vita, M. Giersz, A. Hypki and S. Kamann: *MOCCA-SURVEY Database I: Is NGC 6535 a dark star cluster harbouring an IMBH?* *MNRAS* Vol 464,3, p.3090-3100 (2017).  
Link: <http://adsabs.harvard.edu/abs/2017MNRAS.464.3090A>
24. D. Belloni, M. Giersz, **A. Askar**, N.W.C Leigh and A.Hypki: *MOCCA-SURVEY database I. Accreting white dwarf binary systems in globular clusters - I. Cataclysmic variables - present-day population*. *MNRAS* Vol. 462, 3, p.2950-2969 (2016).  
Link: <http://adsabs.harvard.edu/abs/2016MNRAS.462.2950B>
25. L. Wang, R. Spurzem, S. Aarseth, M. Giersz, **A. Askar**, P. Berczik, T. Naab, R. Shadow and M. B. N. Kouwenhoven: *The DRAGON simulations: globular cluster evolution with a million stars*. *MNRAS* Vol.

458, 2, p.1450-1465 (2016).

Link: <http://adsabs.harvard.edu/abs/2016MNRAS.458.1450W>

26. M. Giersz, N. Leigh, A. Hypki, N. Lützgendorf and **A. Askar**: *MOCCA code for star cluster simulations - IV. A new scenario for intermediate mass black hole formation in globular clusters*. *MNRAS* Vol. 454, 3, p.3150-3165 (2015).

Link: <http://adsabs.harvard.edu/abs/2015MNRAS.454.3150G>

## Research review articles

1. B. Leor, V. Cardoso, S. Nisanke, T. P. Sotiriou, **A. Askar**, K. Belczynski, G. Bertone, E. Bon, D. Blas, R. Brito and 192 coauthors. *Black holes, gravitational waves and fundamental physics: a roadmap Classical and Quantum Gravity* Vol. 36, 14, article id. 143001 (2019).

Link: <https://ui.adsabs.harvard.edu/abs/2019CQGra..36n3001B/abstract>.

## Published Conference Proceedings

1. M. B. Davies, **A. Askar**, R.P. Church: *The Ecology of the Galactic Centre: Nuclear Stellar Clusters and Supermassive Black Holes*, IAU Symposium, Volume 315 (2020)

Link: <https://ui.adsabs.harvard.edu/abs/2020IAUS..351...80D/abstract>

2. **A. Askar**, M. Giersz, , M. Arca Sedda, A. Askar, M. Pasquato, A. Leveque *Stellar-Mass Black Holes in Globular Clusters: Dynamical Consequences and Observational Signatures*, IAU Symposium, Volume 315 (Accepted)

Link: <https://ui.adsabs.harvard.edu/abs/2020IAUS..351..395A/abstract>

3. D. Belloni, M. Giersz, L.E. Rivera Sandoval, **A. Askar**, P. Ciecielag: *Are most Cataclysmic Variables in Globular Clusters dynamically formed?*, IAU Symposium, Volume 315 (2020)

Link: <https://ui.adsabs.harvard.edu/abs/2020IAUS..351..404B/abstract>

4. M. Giersz, **A. Askar**, L. Wang, A. Hypki, A. Leveque, R. Spurzem: *MOCCA-SURVEY database I. Dissolution of tidally filling star – clusters harbouring black hole subsystems*, IAU Symposium, Volume 315 (2020)

Link: <https://ui.adsabs.harvard.edu/abs/2020IAUS..351..438G/abstract>

5. A. Hypki, M. Giersz, **A. Askar**, D. Belloni, A. Leveque: *BEANS – distributed data analysis for numerical simulations*, IAU Symposium, Volume 315 (Accepted)

Link: <https://ui.adsabs.harvard.edu/abs/2020IAUS..351..460H/abstract>

6. M. Giersz, **A. Askar**, J. Klencki, J. Morawski *MOCCA Survey Database I. BHs in star clusters* (Proceedings of the 15th Marcel Grossmann Meeting in Rome (2018)

Link: <https://ui.adsabs.harvard.edu/abs/2019arXiv190403591G/abstract>

7. M. Szkudlarek, D. Gondek-Rosińska, **A. Askar**, T. Bulik, M. Giersz: *Black Hole Binaries from Globular Clusters as Sources of Gravitational Waves* (52nd Rencontres de Moriond on Gravitation (Moriond Gravitation 2017)

Link: [http://inspirehep.net/record/1671193/files/1639583\\_21-26.pdf](http://inspirehep.net/record/1671193/files/1639583_21-26.pdf)

8. M. Giersz, N. Leigh, A. Hypki, **A. Askar**, N. Lützgendorf: *Formation mechanisms of IMBH in globular clusters* (MmSAI v.87, p.555 2016).

Link: <http://adsabs.harvard.edu/abs/2016MmSAI..87..555G>

9. D. Belloni, M. Giersz, **A. Askar**, Hypki: *Cataclysmic variables in globular clusters . First results on the analysis of the MOCCA simulations database* (MmSAI v.87, p.551 2016).

Link: <http://adsabs.harvard.edu/abs/2016MmSAI..87..555G>

10. **A. Askar**, M. Giersz, W. Pych, A. Olech, A. Hypki: *MOCCA code for star cluster simulation: comparison with optical observations using COCOA* (IAU Symposium, Volume 312, pp. 262-263 2016).

Link: <http://adsabs.harvard.edu/abs/2016IAUS..312..262A>

11. M. Giersz, N. Leigh, M. Marks, A. Hypki, **A. Askar**: *Monte Carlo modeling of globular star clusters: many primordial binaries and IMBH formation* (IAU Symposium, Volume 312, pp. 213-222 2016).  
Link: <http://adsabs.harvard.edu/abs/2016IAUS..312..213G>

## Talks & Conferences

- Contributed Talk on “*Formation and growth of supermassive black holes in galactic nuclei: intermediate-mass black holes delivered in stellar clusters*” at European Astronomical Society (EAS) Annual Meeting 2021, Symposium 25: *The route to coalescence of supermassive black hole binaries: a comprehensive view* (Leiden, The Netherlands/Virtual Meeting 2021)
- Invited Seminar on “*Formation and growth of supermassive black holes in galactic nuclei: intermediate-mass black holes delivered in stellar clusters*” at International Teeminar, Organized by ARI Heidelberg/Beijing (2021)
- Contributed Talk on “*Formation and growth of supermassive black holes in galactic nuclei: LISA binaries & intermediate-mass ratio inspirals*” at 3<sup>rd</sup> LISA Astrophysics Working Group Meeting (Zurich, Switzerland/Virtual Meeting 2021)
- Invited Seminar Talk on “*Black Hole Dynamics in Star Clusters: Evolution and Growth from Stellar to Supermassive Scales*” at the CENTRA - Center for Astrophysics and Gravitation (Lisbon, Portugal, 2021)
- Contributed Talk on “*Formation and Growth of Supermassive Black Holes in Galactic Nuclei: Dynamics of Triple Intermediate-mass Black Holes Delivered in Stellar Clusters*” at the Triple Evolution and Dynamics 3 (TRENDY 3 - Virtual Meeting 2021)
- Invited Seminar on “*Formation of gravitational wave sources in star clusters: From stellar to intermediate-mass black holes*” at University of Birmingham (Birmingham, United Kingdom 2020).
- Invited Talk on “*Dynamical formation of gravitational wave sources*” at XIX Serbian Astronomical Conference (Belgrade, Serbia 2020).
- Talk on “*Formation of super-massive black holes in galactic nuclei: delivering seed intermediate-mass black holes in stellar clusters*” at Galaxy Coffee, Max Planck Institute for Astronomy, MPIA (Heidelberg, Germany 2020).
- Talk on “*Formation of intermediate-mass black holes in dense stellar clusters*” at the 13th International LISA Symposium (Virtual Meeting 2020)
- Invited Review Talk on “*Dynamical Formation of Binary Black Holes in Dense Stellar Environments*” at European Astronomical Society (EAS) Annual Meeting 2020, Symposium 5: *What have we learned from the observed population of gravitational wave sources?* (Leiden, The Netherlands/Virtual Meeting 2020)
- Talk on “*Supermassive Black Hole Formation in Galactic Nuclei: The Role of Intermediate-mass Black Holes*” at Compact Objects For All Meeting at Lund Observatory, Department of Astronomy and Theoretical Physics, Lund University (Lund, Sweden 2020)
- Invited Talk on “*Gravitational Wave Sources Originating in Globular Clusters*” at DKGWEM-2020: Gravitational Wave Science in Denmark, Niels Bohr Institute, Copenhagen University (Copenhagen, Denmark 2020)
- Talk on “*Stellar Mass Black Holes in Globular Clusters: Dynamical Consequences and Observational Signatures*” at Galaxy Coffee, Max Planck Institute for Astronomy, MPIA (Heidelberg, Germany 2019).
- Invited Talk on “*Dynamically Driven Mergers of Black Holes in Dense Stellar Environments*” at Astrophysics with Gravitational Wave Detections Workshop (Warsaw, Poland 2019).
- Talk on “*Why Black Holes Matter in Globular Clusters: Dynamical Consequences and Observational Signatures*” at IAUS 351: Star Clusters: from the Milky Way to the Early Universe and MODEST 19 (Bologna, Italy 2019).
- Talk on “*How black holes can influence the evolution of globular clusters*” at the MWStreams 2018

conference on “Survival of Dense Star Clusters in the Milky Way System” (Heidelberg, Germany 2018)

- Invited Talk on “*Black Hole Populations in Galactic Globular Clusters*” at the SFB 881 International Workshop on Star “Clusters around the Milky Way and in the Local Group” (Heidelberg, Germany 2018)
- Invited to attended meeting of the “Evolution of Rich Stellar Populations & Black Hole Binaries” International Space Science Institute (ISSI) Team as a core participant and presented a talk on “*Black Hole Subsystems in Galactic Globular Clusters*” at the ISSI (Bern, Switzerland 2018).
- Talk on “*Black Hole Subsystems in Galactic Globular Clusters*” at MODEST 18 (Santorini, Greece 2018).
- Invited Seminar Talk on “*Investigating Black Hole Populations in Globular Clusters with MOCCA Code for Star Cluster Simulations*” at Galileo Galilei Department of Physics and Astronomy, University of Padova/INAF-Astronomical Observatory of Padova (Padova, Italy 2018).
- Invited Seminar Talk on “*Investigating Black Hole Populations in Globular Clusters with MOCCA Code for Star Cluster Simulations*” at Eötvös Loránd University (Budapest, Hungary 2018).
- Talk on “*MOCCA-Survey Database I: Binary Black Holes and Intermediate Mass Black Holes in Globular Clusters*” at Numerical Scattering Workshop, Center for Computational Astrophysics, Flatiron Institute, (New York City, USA 2017).
- Talk on “*Gravitational Waves and High Energy Sources Originating From Globular Clusters*” at MODEST 17 (Prague, Czech Republic 2017).
- Invited Seminar Talk on “*MOCCA-Survey Database I: Binary Black Holes and Intermediate Mass Black Holes in Globular Clusters*” at Lund Observatory Seminar (Lund, Sweden 2017).
- Seminar Talk on “*MOCCA-Survey Database I: Binary Black Holes and Intermediate Mass Black Holes in Globular Clusters*” at Nicolaus Copernicus Center Wednesday Colloquium (Warsaw, Poland 2017).
- Talk on “*Coalescing Binary Black Holes Originating from Globular Clusters*” at Heraeus-Seminar 61: Stellar Aggregates (Bad Honnef, Germany 2016).
- Invited Seminar Talk on “*MOCCA-Survey Database I: Binary Black Holes and Intermediate Mass Black Holes in Globular Clusters*” at KIAA/Peking University Lunch Talk (Beijing, China 2016).
- Invited Talk on “*Merging Binary Black Holes Originating from Globular Clusters*” at Astro-GR 2016 Meeting (Benasque, Spain 2016).
- Presented poster on “*Simulating Observations of MOCCA Star Cluster Simulations with COCOA*” at EES 2015 School on Stellar Clusters (Banyuls sur Mer, France 2015).
- Talk on “*Simulating Observations of MOCCA Star Cluster Simulations with COCOA*” at MODEST 15 (Concepcion, Chile 2015).
- Poster presentation, “*MOCCA Code for Star Cluster Simulations: Comparison with Optical Observations using COCOA*” at International Conference of Young Astronomers (Toruń, Poland 2014).
- Poster entitled, “*MOCCA Code for Star Cluster Simulations: Comparison with Optical Observations using COCOA*” (presented by M. Giersz) at IAUS 312: Star Clusters & Black Holes in Galaxies across Cosmic Time (Beijing, China 2014).
- Talk on “*X-ray Bursts*” at the 5th Serbian Astronomical Student Workshop hosted by University of Belgrade and University of Novi-Sad (Belgrade, Serbia 2011).

## Prizes & Awards

- Carl Tryggers Fellowship (2018 to 2020)
- PhD Scholarship in Stellar Dynamics, National Science Center, Poland (2013 to 2017)
- Award for Best Poster at International Conference of Young Astronomers (Toruń, Poland 2014)
- Erasmus Mundus (European Commission) Scholarship for Joint Masters Degree in Astrophysics and Astronomy (2010 to 2012) Total Award: 15,000 Euros
- Excellence Scholarship for Undergraduate Studies at University College Utrecht (2006-2009) Total Award: ~ 21,000 Euros
- Merit Scholarship for A Levels at University College Lahore (2004-2006)

- Award for Excellence in Computing, University College Lahore (2005)
- Award for Academic Excellence, Bloomfield Hall School (2001)

## Funding & Grants

- PI of the Fysiografen grant awarded by the Royal Physiographic Society of Lund (2019 to 2020)  
Title: *Evolution of Binaries containing Massive Stars* Total Funding: 13,450 Euros
- Carl Tryggers Fellowship for postdoctoral research awarded by the Carl Tryggers Foundation for Scientific Research (2018 to 2020) Total Funding: 52,500 Euros
- PI of the Preludium grant for PhD students awarded by the Polish National Science Center (2016 to 2018)  
Title: *Black Hole Binary Zoo in Globular Clusters* Total Funding: 15,750 Euros
- PI of the Nicolaus Copernicus Astronomical Center Grant for Young Researchers (2015 to 2017)  
Title: *Simulating Mock Observations of Star Cluster Simulations* Total Funding: 3000 Euros

## Supervision, Mentoring & Teaching Activities

- Gave a 2 hour lecture on “Black holes in stellar clusters” in the ‘ASTM12 - High Energy Astrophysics’ masters course at Lund Observatory (Spring 2021). Also carried out a 2 hour follow up class with group exercises and discussion.
- Led session on “Astrophysical Origin of Gravitational Wave Sources” for the “Topics on Theoretical Astrophysics” PhD course at Lund Observatory (Spring 2021)
- Master thesis supervisor of Markus Strickert (Master student at Lund University 2021-2022)
- Completed course on “Learning and teaching in higher education - theory and practice” for pedagogical training (Lund University, Spring 2020)
- Master thesis supervisor of Lucas Hellström (Master student at Lund University 2019-2020, PhD student at CAMK, Warsaw from 2021)
- Gave a 2 hour lecture on “Neutron stars, pulsars and compact binaries” for the ‘ASTM12 - High Energy Astrophysics’ masters course at Lund Observatory (Spring 2019)
- Co-supervised summer student projects at Nicolaus Copernicus Astronomical Center:
  - Jakub Morawski (2017 Bachelor Student, Warsaw Observatory)
  - Piotr Kołodziejcki (2016 Bachelor Student, Warsaw Observatory)
  - Jakub Klencki (2016 Master Student, Warsaw Observatory)
  - Piotr Adamczyk (2015 Bachelor Student, Warsaw Observatory)
  - Magdalena Szponar (2015 Bachelor Student, Warsaw Observatory)
- Co-supervised and assisted with Masters thesis project of Riko Schadow (Ludwig Maximilian University of Munich, 2015) and research project by Arthur Kuehlwein (Heidelberg University, 2015)

## Popular Talks and Public Lectures

- Presented public talk on “*Simulating Star Clusters: Dynamical Evolution to Merging Black Holes*” at Kulturnatten (Culture Night) 2019 at Lund Observatory, Sweden (21<sup>st</sup> September, 2019).
- Presented public talk on “*Cosmic Explosions: From Supernovae to Colliding Black Holes*” at Knut Lundmark-dagarna 2019 at Lund Observatory, Sweden (13<sup>th</sup> April, 2019).
- Presented public talk (for high school students) on “*Merging Black Holes in Star Clusters: The New Era of Gravitational Wave Astrophysics*” at NMT Dagarna at Lund Observatory, Sweden (19<sup>th</sup> March, 2019).
- Presented public talk on “*Astrophysics of Star Clusters*” at Monthly Meeting of Lahore Astronomical Society (LAST) hosted at Zeds Astronomical Observatory, Lahore, Pakistan (4<sup>th</sup> January, 2019).
- Invited Popular Talk on “*Binary Black Holes and Intermediate Mass Black Holes in Globular Clusters*” at Koło Naukowe Astronomów (Student’s Astronomy Circle), University of Warsaw Observatory (Warsaw, Poland 2017).
- Presented popular talks on ‘Evolution of Star Clusters’ at Spotkanie Młodych (Young Astronomers Meeting), Nicolaus Copernicus Astronomical Center (2014 and 2016).

## **Professional Memberships, Service Work and Meeting Organization**

- Junior Member of the International Astronomical Union (IAU) since 2019  
<https://www.iau.org/administration/membership/individual/18933/>
- Associate member of the LISA (Laser Interferometer Space Antenna) consortium
- Expert reviewer for the following journals: Monthly Notices of Royal Astronomical Society (MNRAS), The Astrophysical Journal (ApJ), ApJ Letters, Astronomy & Astrophysics (A&A), Acta Astronomica
- Examination committee member for master student exams at Lund Observatory (2019, 2020)
- Member of LOC and SOC for ELTs for All meeting at Lund Observatory in Sweden (11 to 12 February, 2019).
- Member of LOC for Spotkanie Mlodych (Young Astronomers Meeting) at Nicolaus Copernicus Astronomical Center (2014 and 2016).

## **Skills & Miscellaneous**

### **Languages**

- Urdu (Native)
- English (Fluent)-TOEFL (Computer Based) Score: 273/300 (February 2006)
- Punjabi (Intermediate Level)
- Dutch (Beginner Level)

### **Computer Skills**

- Scientific programming in Python, Fortran, shell scripting, C
- Wolfram Mathematica and MATLAB

### **Other Activities**

- Assembled and setup muon detectors at University College Utrecht (Part of HiSparc project)
- Junior Advisor at University College Utrecht (2007-2008)
- Represented University College Lahore in many nationwide quiz competitions (2001 to 2006)
- Member of University College Lahore debating team in All-Pakistan parliamentary style debates at Under 17 & Under 19 Level between 2001 & 2006